

CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. An aqueous slurry composition which comprises:
 - 5 A. about 0.01% by weight to about 50% by weight of abrasive particles;
 - B. about 0.01% to about 50% by weight of an oxidizer;
 - C. at least about 500 ppm of a quaternary ammonium hydroxide;
 - D. an acid having a pKa of about 2.5 or lower in an sufficient amount to provide an acidic pH; and
 - 10 E. water.
2. The composition of claim 1 wherein the amount of the abrasive particles is about 1% to about 20% by weight.
3. The composition of claim 1 wherein the amount of the abrasive particles is about 15 5% to about 15% by weight.
4. The composition of claim 1 wherein the abrasive particles comprises silica particles.
5. The composition of claim 1 wherein the oxidizer comprises hydrogen peroxide.
6. The composition of claim 1 wherein the amount of oxidizer is about 0.05 at % to 20 about 5 wt %.
7. The composition of claim 1 wherein the amount of oxidizer is about 0.1 wt, % to about 1 wt. %.
8. The composition of claim 1 wherein the quaternary ammonium hydroxide is represented by the formula:



wherein each of R₄, R₅, R₆ and R₇ individually is an alkyl group of 1 to 20 carbon atoms.

9. The composition of claim 8 wherein the alkyl group contains 1 to 4 carbon atoms.
10. The composition of claim 1 wherein the quaternary ammonium hydroxide comprises tetramethyl ammonium hydroxide or tetrabutyl ammonium hydroxide.
- 5 11. The composition of claim 1 wherein the amount of quaternary ammonium hydroxide is about 1000 ppm or higher.
12. The composition of claim 1 wherein the amount of quaternary ammonium hydroxide is about 2500 ppm or higher.
13. The composition of claim 1 wherein the acid comprises phosphoric acid.
- 10 14. The composition of claim 1 wherein the pH is at least about 1.5.
15. The composition of claim 1 wherein the pH is about 1.5 to about 5.
16. The composition of claim 1 wherein the pH is at least about 2.
17. The composition of claim 1 which further comprises a corrosion inhibitor.
18. The composition of claim 16 wherein the corrosion inhibitor comprises
15 benzotriazole.
19. The composition of claim 1 which further comprises a surface active agent.
20. A method for polishing a metal which comprises providing on the metal an aqueous slurry composition comprising:
 - A. about 0.1% by weight to about 50% by weight of abrasive
20 particles;
 - B. about 0.1% to about 50% by weight of an oxidizer;
 - C. at least about 500 ppm of a quaternary ammonium hydroxide;
 - D. an acid being a pKa of about 2.5 or lower in amount to provide an acidic pH;

and E. water;

and contacting the metal with a polishing pad.

21. A process for fabricating semiconductor integrated circuit structure comprising:
forming circuits on the surface of a semiconductor wafer by photolithographic process;
5 planarizing the surface by chemical mechanical polishing with the composition of claim 1.

22. The process of claim 21 wherein the integrated circuit structure comprise a
semiconductor substrate; a ferromagnetic metal layer; a metal selected from the group
consisting of group 3d and 5d of the periodic table; a layer of copper or aluminum; a barrier
layer; and a dielectric layer.

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